PSY402
Theories of Learning

Chapter 7 – Aversive Conditioning
Aversive Events

- Unpleasant, undesirable, bad for survival.
- Typically evoke strong negative emotion:
  - Pain, fear, embarrassment or shame, anxiety, frustration.
- Strong emotions motivate escape and avoidance behaviors.
Escape Conditioning

- **Escape response** – behavior motivated by an aversive event.
  - Rewarded by termination of the aversive event.
- Miller’s **shuttlebox** – rats escape shock by turning a wheel that opens a door so they can escape.
Shuttle boxes

IF YOU ONLY FOCUS ON THE PROBLEM

YOU MIGHT MISS THE EASY SOLUTION
Factors Affecting Escape

- Intensity of the aversive event – the stronger the aversive event the greater the escape response.

- Amount of negative reward – escape depends on receiving relief from the aversive event.

- Reward must be prompt – delayed reward interferes with escape learning.
Figure 7.1  The mean escape performance for both starting and running speed increases over the last eight training trials with a higher shock intensity.
Delay in Shock Termination

Figure 7.2  The mean escape performance declines with a longer delay in shock termination.
Eliminating an Escape Response

- Removal of negative reinforcement – escape response stops if the aversive event continues despite it.

- Removal of aversive event -- escape response stops if the aversive event no longer occurs.
  - Continues for a while due to conditioned anticipatory pain responses (fear). This must be extinguished.
Resistance to Extinction

Figure 7.3 The mean number of escape responses during extinction increases with the number of acquisition trials.

Escape is harder to extinguish with more escape training trials.
Vicious-Circle Behavior

- Why did rats run into a pathway with shock when staying still would mean no shock?

- Two explanations:
  - Fear motivates running and is conditioned to the start box.
  - The animals do not realize that no shock will occur if they don’t run.
Vicious Circle Behavior

Figure 7.4 The mean escape latency during extinction for animals receiving either no shock in the alley, shock in the entire 6-foot alley (long-shock condition), or shock only in the last 2 feet of alley before the goal box (short-shock condition). The resistance to extinction is higher in the long- and short-shock conditions than in the no-shock condition.

Rats with shock in any part of the alley fail to realize they will not be shocked if they stay in the start box.
Avoidance

- **Active avoidance response** – an action is necessary to avoid aversive event.
- **Passive avoidance response** – not responding prevents aversive event.
- Mowrer’s studied avoidance using a hurdle jumping paradigm (shuttle box).
  - CS causes animal to jump to other side to avoid onset of shock.
In *escape learning*, there is no light (CS) to warn the rat. It jumps when it feels the shock.

In *avoidance learning*, the light signals the onset of the shock so the rat learns to jump ahead of it.

Figure 7.5  A shuttle box used to study avoidance learning. When the conditioned stimulus (a light) is presented in one side of the box, the animal must jump to the other compartment to avoid the electric shock.
Effects of Event Intensity

- A stronger aversive event leads to faster avoidance learning.
  - Two-way avoidance learning is an exception.
- The greater the aversive event intensity, the faster the passive avoidance learning.
- Greater delay between CS and UCS interferes with avoidance learning.
One-Way vs Two-Way Avoidance

- One-way – animal can avoid shock by jumping to other side.
- Two-way – animal can jump to other side, but after a rest, it must jump back again to avoid shock.
  - Animal avoids shock only by returning to the place where it was first shocked.
  - The animal must ignore situational cues.
  - Induces a conflict.
Effects of Shock Intensity

Figure 7.6 The influence of shock intensity on the acquisition of a one-way and a two-way active avoidance response. Increases in shock intensity facilitate one-way avoidance learning but impair two-way avoidance acquisition.
Delay Interval for the Warning (CS)

- Avoidance behavior depends on recognizing an environmental cue that provides a warning (CS).
- The longer the delay between the CS and the UCS, the slower the learning to avoid the UCS.
- Fear of the CS is diminished with a greater interval, so motivation to avoid is weaker.